REMARKS

As a result of this amendment, claims 1-28 and 32-38 are now pending. Of these, claims 4, 5, and 34 stand objected; 1-28 and 32-38 stand rejected under §112; and claims 1-3, 7-11, 28, and 35-38 stand rejected under §103.

Applicant reserves all applicable rights not asserted in or with this response, including, for example, the right to rebut tacit and explicit characterizations of one or more cited references, and the right to swear behind one or more cited references.

Response to Objections

The Examiner objected to claims 4, 5, and 34 as being dependent upon a rejected base claim, but indicated them to be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

In response, applicant has rewritten each of these claims in independent form, and respectfully requests withdrawal of the objection.

Response to §112 Rejections

The Examiner rejected claims 1-28 and 32-39 under 35 USC § 112, second paragraph, as being indefinite, specifically charging that the claims were incomplete for omitting essential steps, such as "how ... or where the metal is formed to perform the cross-diffusion."

In response, applicant submits respectfully that the Action presents no evidence that the claims omit any acts that are essential or critical. Indeed, the entire specification is devoid of the terms essential and critical. Thus, there appears to be zero basis for asserting that acts related to "how ... or where the metal is formed" are "essential" to the claimed invention.

Moreover, the claims are definite in so far as any omission of acts related to formation of metal clearly and unambiguously conveys that the scope of the claimed invention is not limited by any such acts. Indeed, as evidenced by the text of the rejection, the claims provide a clear and definite omission of limitations related to formation of the metal, not a vague, ambiguous, or indefinite expression.

Accordingly, applicant requests respectfully that the §112 rejections be withdrawn.

Response t §103 Rejections Based on Tsai and Wolf

The Examiner rejected claims 1-3, 7-11, 28, and 35-39 under 35 USC §103(a) as unpatentable over Tsai (U.S. Patent 5,235,204) in view of Wolf ("Silicon Processing for the VLSI ERA", Vol. 2, (Process Integration), Lattice Press, 1990 pp. 116-117 and 126-127).

In response, applicant asserts respectfully that the rejection fails to make a prima facie case of obviousness and should be withdrawn for at least four reasons.

First, it is not reasonably certain that the transport of Si into the Al reported in Wolf constitutes cross diffusion of metal and a portion of a polysilicon structure. More precisely, it is not clear in Wolf that the transport of Si into the Al results in cross transport of the Al into the Si as necessary to constitute a cross-diffusion. Applicant submits that in its ordinary usage, cross diffusion is a two-way process.

Although the Examiner asserts that "[i]t is well known in the art that when one distinct material is transported into another material is cross diffusion," he cites no supporting reference. Thus, the Examiner tacitly takes Official Notice of this assertion. Accordingly, applicant requests pursuant to MPEP 2143 that the Examiner provide an affidavit or other credible documentation that the art defines "cross diffusion" as occurring when one distinct material is transported into another material. In the alternative, the assertion and all rejections that rely on it should be withdrawn.

Second, the proposed motive for combining Wolf with Tsai is invalid. The Examiner proposes that "[i]t would have been obvious to form the metal emitter contact of Tsai by cross diffusing the metal and a portion of the polysilicon structure, because [Wolf teaches that] this process alleviates the problem of junction spiking. However, this misrepresents Wolf.

Junction spiking results normally from the transport of silicon into aluminum. Wolf explains that when its sacrificial layer donates silicon to the aluminum contact, rather than the underlying silicon substrate donating it, void formation is prevented in the substrate and this in turn prevents junction spiking. Thus, it is not the act of silicon transport that prevents the junction spiking, but rather placement of a sacrificial layer in a position to prevent silicon transport from the substrate. (See Wolf page 126, section 3.5.2.2.)

If the act of silicon transport into the aluminum really prevented junction spiking, as the rejection suggests, then one would subject aluminum contacts to high current stresses to achieve

the desired prevention, since Wolf clearly explains that the silicon transport from its sacrificial layer occurs in response to high current stress. Of course, this is absurd. Thus, one of ordinary skill would not read this Wolf passage as teaching that "silicon transport prevents junction spiking.

Third, Wolf teaches way from the rejected claims. Wolf recognizes that silicon transport from its substrate is undesirable and prevents such transport using its sacrificial layer. In addition, Wolf states, at page 126, line 1, that "[i]nterdiffusion is the dominant process that destroys these contact structures." Thus, at least to this extent, Wolf teaches away from the rejected claims, which constructively cross-diffuse to form a contact.

Fourth, the rejection is premised on impermissible degree of hindsight. Even assuming for argument that Wolf teaches that silicon transport itself prevents junction spiking, there is no evidence in the record that this silicon transport would be useful to fabricate or form an emitter contact. In fact, Wolf states that its silicon transport occurs during operation under high current stress, not in fabrication.

Additionally, it does not appear that Tsai even has a problem with junction spiking. Indeed, as reported at column 6, lines 49-68 with reference to Figure 6, Tsai already provides a polysilicon layer 60 ---arguably analogous to Wolf's sacrificial polysilicon layer--- between its emitter region and higher level metallization. The facts that Wolf itself fails to teach use of its silicon transport during fabrication and that Tsai does not appear to suffer from junction spiking suggests that the Examiner has applied an impermissible degree of hindsight in formulating the rejection.

Accordingly, applicant respectfully urges the Examiner to reconsider and withdraw the §103 rejections based on Tsai and Wolf.

Response to §103 Rejections Based on Tsai, Wolf, and Aboelfotoh

The Examiner rejected dependent claim 6 as unpatentable over Tsai in view of Wolf, and further in view of Aboelfotoh (U.S. Patent 5,801,444). In response, applicant submits that this proposed three-part combination of Tsai, Wolf, and Aboelfotoh inherits the deficiencies of the proposed Tsai-Wolf combination. Accordingly, the rejection of claim 6 fails to establish a prima facie case for obviousness and should also be withdrawn.

Conclusion

In view of the foregoing remarks, applicant respectfully requests reconsideration and withdrawal of all objections and rejections. Additionally, applicant invites the Examiner to call patent counsel Eduardo Drake at 612-349-9593 to resolve any issues which may delay allowanc

If necessary, please charge any additional fees or credit overpayment to Deposit Accoun No. 19-0743.

Respectfully submitted,

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CERTIFICATE UNDER 37 CFR 1.8: The undersigned hereby certifies that this correspondence is being deposited with the United States Postal Service with sufficient postage as first class mail, in an envelope addressed to: Commissioner of Patents, Washington, D.C. 20231, on this 16 d January, 2002.

Tina Pugh
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Signature